

rectal cancer, the clinical target volume was delineated and for breast cancer, the regional nodal areas (internal mammary, level I to IV axillary and Rotter space) were contoured. A trained radiation technologist then reviewed all cases according to the guidelines and feedback was given within 24 hours. Twenty-four departments participated to the study and in total more than 2200 contours were reviewed: over 1200 rectal cancer patients and over 1000 breast cancer patients. Evaluation of the contours showed that 74 % of rectal cancer cases were modified. These high numbers indicate that the interpretation of guidelines is not always straightforward. More important however is the learning curve that was achieved. The rectal overlap and volumetric parameters significantly increased between the first ten patients per center and others. The study of the contouring of the locoregional nodal delineation in breast cancer is still ongoing and first results will be presented at presented at the ESTRO 35. For both breast and rectal cancer, some deficiencies in the description of the guidelines were demonstrated, making the interpretation ambiguous, and the guidelines will be adapted accordingly. Within a national QA project, we have shown that clinical audit of target delineation improves the quality of the contouring: the inter-observer variability and the major deviations from the guidelines are substantially reduced. Variability in anatomical contouring contributes to uncertainty in treatment planning and compromises the quality of the treatment plan and delivered treatment. The standardization of tumor and target volume contouring is therefore highly desirable and can be positively influenced by consensus guidelines, education and clinical audits.

SP-0292

Standardisation and treatment planning

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Current plan generation is an iterative trial-and-error procedure in which the planner tries to steer the treatment planning system (TPS) towards an acceptable plan by tweaking of parameters, such as beam angles, goal functions or weights. A plan is generally considered acceptable if it fulfills minimum requirements for tumour and OARs, while significant further improvement of the dose distribution is considered infeasible (within the allotted time). On top of the high workload, the current planning approach leads to suboptimal plan quality: the quality is strongly dependent on the skills and experience of the planner (operator dependence), plan quality is dependent on allotted time, and quality is dependent on subjective preferences and priorities of the planner and the treating physician. Can this variability be reduced? Can treatment planning be standardised? Can we guarantee that each patient will be treated with an individualised, clinically highly favourable (best) treatment plan when generated in an efficient manner? In this presentation, data will be provided demonstrating difficulties that clinicians encounter in evaluating treatment plans. Furthermore, the concept of automated treatment plan generation will be discussed as a procedure that may be used to standardise treatment planning. Examples of the positive impact on plan quality will be presented and consequences for involved personnel and plan quality assurance will be discussed.

SP-0293

Potentials and challenges of automated contouring in treatment planning

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Delineation of targets and normal tissues, typically performed on CT and/or MR images, is still one of the largest sources of variability in radiation therapy treatment plans. In fact, despite well-described guidelines for manual

contouring, substantial intra and inter-observer variations exist. Moreover manual contouring is a time consuming process that, depending on the number and complexity of contours to be delineated, can hinder the implementation of adaptive radiotherapy approach. Current perspectives on contouring procedure suggest that an automated approach could reduce both the contouring time and inter-observer variations. Studies evaluating automated contouring in multiple disease sites have in fact demonstrated the potential to improve efficiency and variability associated with manual segmentation. In practice, automated contour are carried out using atlas-based, model-based or hybrid approaches. In atlas-based segmentation the CT scan of a new patient is segmented using segmented scans of one (single-patient) or more (multi-patient) previously treated patients, called atlases. Methods based on classical deformable models use local image features and automatically adapts the model shape to fit patient's organ. Various implementations of these two principal methods are described in the literature and are available in commercial contouring software. Prior their clinical use automated contouring methods need an accurate validation. This is a challenging task as medical image segmentation lacks a known gold standard in its real world application. Phantoms as well as synthetic images provide an easily identifiable ground truth but are an unrealistic surrogate for patient imaging. Moreover, evaluation methods have also lacked consensus as to comparison metrics. A number of different methods have been utilized for comparing segmentation results. The common metrics used fall into one of two categories: volume based or distance based. Each of the comparison metrics has limitations and thus it is desirable to use multiple metrics where possible. This presentation will discuss the advantage in standardization deriving from the use of automatic contouring and the different approach followed in the implementation and validation of automated segmentation tools in different anatomical districts.

SP-0294

Implementation of new standards in your department: a RTT perspective

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Standardisation of clinical practice is essential for the delivery of safe, accurate radiotherapy treatments. Implementation of new standards can be at both local and national levels and examples of these approaches, from an RTT perspective, will be discussed. New standards should be developed and implemented within a multi-professional team setting. Each profession has a role to play and bring different perspectives to the development and implementation process.

Development of training and competency assessments for the use of new delivery techniques are an essential aspect of implementing any new standards. These assessments can be established locally using national guidelines. For example the UK National Radiotherapy Implementation Group IGRT recommendations¹ which was written by a multi-profession team to assist centres in utilising IGRT equipment and details content for IGRT training and competency assessment programmes. This recommendation document has been instrumental in the UK with ensure appropriate utilisation of IGRT for each anatomical site and ensuring quality IGRT is delivered to patients. RTTs are also involved in the preparation of national SABR guidelines, as part of the UK SABR consortium, particularly focusing on the treatment delivery and IGRT sections.

Clinical trials provide a controlled environment where new standards can be developed in a quality assured way. A UK prostate radiotherapy clinical trial utilised both IMRT and IGRT within the context of a study evaluating a number of fractionation schedules. This assisted the centres involved to develop IMRT and IGRT standards within their departments within a quality assured clinical trial. RTTs were able to use IGRT processes clearly defined within the protocol and the support of the QA team for the trial were available for advice